

REQUEST FOR RECONSIDERATION

Claims 15 – 25 are active.

The claimed invention provides a process for preparing an aqueous polyurethane dispersion, comprising:

preparing a polyurethane **in the presence of** N-ethylpyrrolidone or N-cyclohexylpyrrolidone; and

dispersing the prepared polyurethane in an aqueous medium,

wherein

the polyurethane comprises at least one component having at least one hydrophilic group or a group which can be converted to a hydrophilic group, and is dispersible in water.

Conventionally, N-alkyl pyrrolidones are added to finished polyurethane dispersions to adjust the physical parameters of the dispersion. Surprisingly, Applicants have discovered that if N-ethyl- or N-cyclohexyl-pyrrolidone is present during the preparation of the polyurethane according to the claimed method, advantages including at least one of the following (Page 16, lines 24-34) may be obtained:

Reduced solvent requirement.

The dispersions are easier to apply by spraying or through nozzles, since encrustation or contamination on spraying tools is reduced.

Lower toxicity than, for example, N-methylpyrrolidone.

The prepolymer solutions have a lower viscosity.

The rheology of the polyurethane dispersions is improved.

The wetting behavior of substrates or additives is improved.

Lower yellowing under light and/or heat exposure.

Greater frost resistance of the dispersions.

Improved flexibility, particularly lower-temperature flexibility, of the resultant films.

Higher gloss of the resultant films.

Further, Applicants have shown in the Declaration of Dr. Karl Häberle, submitted July 11, 2008, that the polyurethane obtained according to the present invention has significantly improved steam resistance in comparison to a polyurethane prepared in the

presence of N-methylpyrrolidone. Applicants have described the following (page 16, line 40 bridging to page 17):

One possible reason for this might be that the polyurethanes prepared inventively absorb the N-(cyclo)alkylpyrrolidone by swelling, for example, over the whole of the cross section, whereas in the case of subsequent addition only superficial absorption, at best, can take place.

The rejection of Claims 15-25 under 35 U.S.C. 103(a) over Bruchmann et al. (DE 10161156; equivalent to U.S. 2005/0043467) in view of Galan et al. (U.S. 4,757,095) is respectfully traversed.

Bruchmann describes an aqueous dispersion of a water dispersible polyurethane and a process for preparing the aqueous dispersion involving reacting the monomers in the presence of a cesium salt. Bruchmann indicates that if a solvent is used, it should have a boiling point of from 40 to 100°C. under atmospheric pressure [0081] and that one of ordinary skill in the art would recognize that having a boiling point in the described range would allow for facile removal by distillation under reduced pressure as described. Applicants have shown that the boiling points of N-ethylpyrrolidone and N-cyclohexylpyrrolidone are 97 °C/20mm Hg and 154 °C/7 mm Hg respectively. Therefore, one of ordinary skill in the art would recognize that the claimed components do not have the boiling point properties suggested by Bruchmann. Nowhere does this reference disclose or suggest the addition of N-ethyl- or N-cyclohexylpyrrolidone to the preparation of the prepolymer mixture.

The Office acknowledges that “Bruchmann does not teach preparing the polyurethane in the presence of N-ethylpyrrolidone or N-cyclohexyl pyrrolidone (Official Action dated February 3, 2010, page 2, lines 22-23) and cites Galan as teaching the use of lactones and lactams in the preparation of polyurethanes.

Galan describes a polyurethane-polyurea composition containing **a reaction product of a urethane-modified quasi-prepolymer with a lactone or lactam** (Claim 1 and Claim

6). Applicants further note that in the description of Examples 1-6, Galan describes superior stability of the described composition wherein the γ -butyrolactone is incorporated by reaction in comparison to a blended composition (Col. 8, lines 31-37).

Galan is directed to a non-aqueous technology (microcellular foam systems) employing polymers not specifically composed to be water dispersible and therefore does not describe or suggest a method for preparing an aqueous dispersion. Nowhere does this reference disclose that the polyurethane is water dispersible nor is there any suggestion regarding water dispersibility of the polymer composition.

The Office has stated (Official Action dated February 3, 2010, beginning on page 2, line 24 and continuing to page 3):

However, Galen et al. teaches using lactones and lactams in the preparation of polyurethanes (Abs). A particularly suited lactam is N-ethylpyrrolidone (6:35-40). Bruchmann and Galan are analogous art because they are from the same field of endeavor, namely polyurethane additives. At the time of the invention a person of ordinary skill in the art would have found it obvious to have used N-ethylpyrrolidone, as taught by Galan, in the invention of Bruchmann, in order to make a polyurethane product with the unexpected and improved properties when compared to polyurethane elastomers which are prepared in the absence of either a lactone or a lactam, such as good cold temperature flexibility.

Applicants submit that as described above, Galen describes incorporating a lactone or lactam into a polyurethane by chemical reaction. If this technology is combined with the description of Bruchmann, a lactone or lactam would therefore be chemically incorporated into the water dispersible polyurethane of the primary reference.

In contrast, the present invention describes a process for preparing an aqueous polyurethane dispersion by preparing the polyurethane **in the presence of** N-ethylpyrrolidone or N-cyclohexylpyrrolidone. Applicants submit that according to the claimed invention N-ethylpyrrolidone or N-cyclohexylpyrrolidone are solvents, not reactants

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as described by Galen. Therefore, the combination of references the Office has cited does not describe the elements of the present invention.

In discussion of “**Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc.**” the Office has stated:

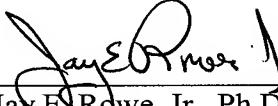
“The rationale to support a conclusion that the claim would have been obvious is that **all the claimed elements were known in the prior art** and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention. “[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” **If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art,**” (Federal Register, Vol. 72, No. 195, page 57529) (Bold added)(Citations omitted)

In view of all the above, Applicants respectfully submit that the cited combination of references does not describe the elements of the present invention and therefore a conclusion of obviousness cannot be supported. Accordingly, withdrawal of the rejection of Claims 15-25 under 35 U.S.C. 103(a) over Bruchmann in view of Galan is respectfully requested.

Applicants respectfully submit that the above-identified application is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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